IN THE CLAIMS:

1. (Currently Amended) A method for receiving and decoding signals in a multicarrier transmission system comprising the steps of:

receiving, from each of a plurality of antennas, a multicarrier signal corresponding to a transmitted multicarrier signal;

applying a Fast Fourier transformation[[s]] to ~~carriers of~~ each of said received multicarrier signals to form respective transformed multicarrier signals;

estimating ~~channel~~ characteristics of a ~~multicarrier~~ channel over which said transmitted multicarrier signal ~~was transmitted~~ passed to said antennas using iterative forward processing; and

decoding said transformed multicarrier signal.

2. (Currently Amended) The method according to claim **1**, wherein said iterative forward processing comprises the steps of:

accepting a transformed block of a frame from each of said transformed multicarrier signals ~~from said step of applying Fast Fourier transformations~~, said transformed block having an associated ~~ordinal~~ block number that indicates ordinal position of said block in said frame;

determining whether said transformed blocks accepted from transformed multicarrier signals, ~~is~~ corresponds to a transmitted training block;

if said accepted transformed blocks correspond to ~~is a~~ said transmitted training block

    (a) calculating a tentative reference signal from said accepted transformed blocks ~~of said multicarrier signal~~;

    (b) generating a tentative estimation of channel characteristics using said tentative reference signal;

    (c) incrementing said ~~ordinal~~ block number;

    (d) returning to said step accepting if said ~~ordinal~~ block number indicates that an end of said frame has not been reached;

if said accepted transformed blocks do not correspond to ~~is not~~ a training block,

(f) decoding said <u>accepted</u> transformed block<u>s</u> of said received multicarrier signal;

(g) re-calculating said reference signal based on said <u>accepted</u> transformed blocks and results of said decoding;

(h) re-generating said estimation of channel characteristics, using the reference signal re-calculated in step (g);

(i) re-decoding said <u>accepted</u> transformed block<u>s</u> using the estimation of channel characteristics <s>ge</s><u>re</u>-generated in step (h); and

(j) returning to step (a).

3. (Previously Presented) The method according to claim **2**, wherein said decoding and re-decoding steps are performed using $\hat{\mathbf{c}}_n = \arg\min_{\mathbf{c}_n} \sum_m \|\mathbf{x}_{m,n} - \hat{\mathbf{H}}_{m,n}\mathbf{c}_n\|^2$, where $\mathbf{x}_{m,n}$ is the transformed block, $\hat{\mathbf{H}}_{m,n}$ is said estimation of channel characteristics, $\mathbf{c}_n$ is a vector of known result values, and $\hat{\mathbf{c}}_n$ is a vector of the decoded results.

4. (Canceled).

5. (Canceled).

6. (Canceled).

7. (Currently Amended) The method according to claim **1**, where each of said decoding steps <s>further</s> comprises the steps of:

demodulating said <u>accepted transformed blocks</u> <s>multicarrier received signal</s>; and

Viterbi decoding the demodulated multicarrier signal.

8. (Currently Amended) The method according to claim **7**, further comprising the step of deinterleaving the demodulated <u>accepted transformed blocks</u> <s>multicarrier signal</s> prior to Veterbi decoding <s>said multicarrier signal</s> if said <u>transmitted</u> multicarrier signal was interleaved <s>for</s> <u>prior to</u> transmission.

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9. (Currently Amended) The method according to claim 7, wherein said ~~steps of receiving and applying are carried out on at least two separate concurrently received multicarrier signals, said step of estimating is responsive to signals developed from said at least two separate concurrently received multicarrier signals, and~~ said step of demodulating includes a step of demodulating each of said <u>accepted transformed blocks to form demodulated signals</u> ~~at least two separate concurrently received and transformed multicarrier signals~~ and combining the demodulated signals using a maximum ratio combiner.

10. (Canceled).

11. (Canceled).

12. (Canceled).

13. (Canceled).

14. (Canceled).

15. (Canceled).

16. (Currently Amended) A method for estimating channel characteristics in a multicarrier transmission system comprising the steps of:

receiving<u>, from each of a plurality of receiving ports,</u> a<u> sequence of </u>multicarrier signal <u>blocks of a transmitted frame containing a plurality of blocks, where each received block has an associated block number that designates an ordinal position of said block in said frame;</u>

<u>processing received blocks of said frame having block number N (blocks N) by</u>

applying<u>, to said blocks N</u> Fast Fourier transformations to ~~carriers of said multicarrier signal~~ <u>form transformed blocks N; and</u>

~~estimating~~ <u>determining information contained in said transformed blocks</u>

<u>N</u> ~~channel characteristics of a multicarrier channel over which said~~

~~multicarrier signal was transmitted~~ using iterative backward processing,

wherein said iterative backward processing ~~further~~ comprises the steps of;

~~determining if a block in a frame in the received mulitcarrier signal is correct;~~

tentatively decoding said <u>transformed</u> block<u>s</u> <u>N</u> ~~of said received~~

~~multicarrier signal;~~

calculating a tentative reference signal based on a previous<u>ly</u>

processed ~~training~~ block<u>s</u> <u>that correspond to a transmitted training block</u>;

generating a tentative estimation of channel characteristics using

said tentative reference signal;

<u>re</u>-decoding said <u>transformed</u> block<u>s</u> <u>N</u> ~~of said received~~

~~multicarrier signal;~~

calculating a reference signal based on said <u>re-decoded</u> ~~received~~

<u>transformed</u> block<u>s</u> <u>N</u>;

generating an estimation of channel characteristics using said

reference signal;

decrementing <u>value of</u> the block number <u>N</u>;

determining ~~if~~ <u>whether the decremented value of N corresponds to</u>

the beginning of said frame ~~has been reached~~; <u>and</u>

<u>returning to said step of processing when N does not correspond to</u>

<u>the beginning of said frame.</u>

~~accepting a next block of received mulitcarrier signal if said beginning of said~~

~~frame has not been reached; and~~

~~iteratively performing the steps above; and~~

~~decoding said transformed multicarrier signal.~~

17. (Canceled).

18. (Canceled).

19. (Canceled).

20. (Canceled).

21. (Currently Amended) The method according to claim **16**, wherein said tentatively decoding ~~step~~ and said re-decoding each employs a combined signal developed with ~~further~~ ~~comprises the steps of~~ by:

demodulating said transformed blocks N to form demodulated signals ~~transformed multicarrier received signal~~;

combining said demodulated ~~multicarrier~~ signals using a maximum ratio combiner to form said combined signal; and

Viterbi decoding said combined signal.

22. (Original) The method according to claim **21**, further comprising the step of deinterleaving said combined signal if said combined signal was interleaved for transmission.

23. (Canceled).

24. (Currently Amended) The method according to claim **21**, wherein said demodulating step is performed substantially concurrently on said transformed blocks N ~~for all signals of said multicarrier signal~~.

25. (Canceled).

26. (Currently Amended) The method according to claim **16**, wherein Fast Fourier transformations are applied to each of said sequences received from the receiving ports ~~carrier of said multicarrier signal~~.

27. (Currently Amended) A method for estimating channel characteristics in a multicarrier transmission system comprising the steps of:

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receiving a multicarrier signal;

applying Fast Fourier transformations to ~~carriers of~~ said multicarrier signal <u>to</u> <u>form a transformed multicarrier signal</u>;

estimating channel characteristics of a multicarrier channel over which said multicarrier signal was transmitted concurrently using iterative <u>forward</u> processing and iterative backward processing; and

decoding said transformed multicarrier signal.

28. (Canceled).

29. (Canceled).

30. (Currently Amended) The method according to claim **27**, wherein said decoding step further comprises the steps of:

demodulating said <u>received</u> multicarrier ~~received~~ signal;

combining said demodulated multicarrier signal using a maximum ratio combiner; and

Viterbi decoding said combined signal;

31. (Original) The method according to claim **30**, further comprising the step of deinterleaving said combined signal if said combined signal was interleaved for transmission.

32. (Currently Amended) The method according to claim **30**, wherein said demodulating step is performed using QPSK <u>demodulating</u> techniques.

33. (Currently Amended) The method according to claim **7**, wherein said demodulating step is performed using QPSK <u>demodulating</u> techniques.

34. (Currently Amended) The method according to claim **9**, wherein said demodulating step is performed using QPSK <u>demodulating</u> techniques.

35. (Currently Amended) The method according to claim <u>21</u> 2̶0̶, wherein said demodulating step is performed using QPSK <u>demodulating</u> techniques.

36. (Original) The method according to claim **27**, wherein Fast Fourier transformations are applied to each carrier of said multicarrier signal.